

U.S. Patent Application No. 10/649,347
Amendment dated April 30, 2007
Reply to Office Action of December 28, 2006

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Original): A method of providing product consistency comprising the steps of:
 - a) maintaining at least one morphological value of a particulate material within a first target range and
 - b) maintaining at least one interfacial potential property value of the particulate material within a second target range.
2. (Original): The method of claim 1, further comprising the step of maintaining at least one chemical value of the particulate material.
3. (Original): The method of claim 2, wherein the chemical value is pH or functional group level.
4. (Original): The method of claim 1, wherein the particulate material is carbonaceous.
5. (Original): The method of claim 1, wherein the particulate material is carbon black.
6. (Original): The method of claim 1, wherein the particulate material is a metal oxide.
7. (Original): The method of claim 1, wherein the particulate material is fumed silica.

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8. (Original): The method of claim 1, wherein the morphological value is surface area, particle size, structure, porosity, or combinations thereof.
9. (Original): The method of claim 1, wherein the first target range for the morphological value is within about 10% of the morphological value.
10. (Original): The method of claim 1, wherein the second target range for the interfacial potential property value is within about 50% of the interfacial potential property value.
11. (Original): The method of claim 1, wherein the step of maintaining at least one morphological value of a particulate material comprises
 - i) determining at least one morphological value of the particulate material; and
 - ii) adjusting at least one process variable of a process for producing the particulate material, wherein the adjustment maintains the morphological value within the first target range.
12. (Original): The method of claim 11, wherein the morphological value is determined during the process for producing the particulate material.
13. (Original): The method of claim 11, wherein the morphological value is determined prior to shipping the particulate material to a customer.

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14. (Original): The method of claim 1, wherein the step of maintaining at least one interfacial potential property value of a particulate material comprises

i) determining at least one interfacial property value of the particulate material; and
ii) adjusting at least one process variable of a process for producing the particulate material, wherein the adjustment maintains the interfacial potential property value within the second target range.

15. (Original): The method of claim 14, wherein the interfacial potential property value is determined during the process for producing the particulate material.

16. (Original): The method of claim 14, wherein the interfacial potential property value is determined prior to shipping the particulate material to a customer.

17. (Original): The method of claim 11, wherein the morphological value is determined by liquid adsorption, vapor adsorption, microscopy, or combinations thereof.

18. (Original): The method of claim 11, wherein the morphological value is determined by an adsorption method using iodine, nitrogen, CTAB, DBP, or paraffin oil.

19. (Original): The method of claim 11, wherein the particulate material comprises carbonaceous material and wherein the process variable is selected from the group consisting of: combustion stoichiometry, reactor quench length, feedstock composition, primary fuel type, level of downstream additives, and post treatment conditions.

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20. (Original): The method of claim 11, wherein the particulate material comprises metal oxide and wherein the process variable is selected from the group consisting of: combustion stoichiometry, amount of quench air, feedstock composition, primary fuel type, level of downstream additives, and post treatment conditions

21. (Original): The method of claim 14, wherein the interfacial potential property value is determined by an interfacial potential absorptometry method.

22. (Original): The method of claim 21, wherein the interfacial potential absorptometry method uses a liquid other than DBP or paraffin oil.

23. (Original): The method of claim 21, wherein the interfacial potential absorptometry method uses water, ethylene glycol, or mixtures thereof.

24. (Original): The method of claim 14, wherein the interfacial potential property value is determined by a wicking rate method.

25. (Original): The method of claim 14, wherein the interfacial potential property value is determined by a yield point method.

26. (Original): The method of claim 14, wherein the interfacial potential property value is determined by a interfacial potential vapor adsorption method.

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27. (Original): The method of claim 14, wherein the interfacial potential property value is determined by an IGC method.

28. (Currently amended): A method of controlling a process for producing a particulate material comprising the steps of:

- a) determining at least one morphological value of the particulate material and at least one interfacial potential property value of the particulate material;
- b) comparing the morphological value and the interfacial property ~~property~~ value of the particulate material to a target morphological value and a target interfacial potential property value; and
- c) if necessary, adjusting at least one process variable for the process.

29. (Original): The method of claim 28, wherein the process variable is correlated to the interfacial potential property value.

30. (Withdrawn): A method of producing a target particulate material having at least one target morphological value and at least one target interfacial potential property value, wherein the method comprises the steps of:

- a) producing a sample particulate material having the target morphological value of the target particulate material;
- b) determining at least one interfacial potential property value of the sample particulate material;

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c) determining the difference between the interfacial potential property value of the sample particulate material and the target interfacial potential property value of the target particulate material;

d) adjusting at least one process variable of the process;

e) repeating steps a)-d) until the difference between the interfacial potential property value of the sample particulate material and the target interfacial potential property value of the target particulate material is less than or equal to a target delta; and

f) producing the target particulate material having the target morphological value and the target interfacial potential property value using the adjusted process variables.

31. (Withdrawn): A method for quality control comprising analyzing at least one interfacial potential property value of a particulate material on a routine basis to insure quality control.

32. (Withdrawn): A method for quality assurance comprising analyzing at least one interfacial potential property value in a particulate material on a routine basis prior to shipment to a customer to insure quality assurance.

33. (Withdrawn): The method of claim 31, wherein said method further comprises analyzing at least one morphological value of said particulate material on a routine or non-routine basis to insure quality control.

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34. (Withdrawn): The method of claim 32, further comprising analyzing at least one morphological value of said particulate material on a routine or non-routine basis to insure quality assurance.

35. (Withdrawn): A quality control system comprising a test for determining at least one interfacial property value of a particulate material and a device or medium to record said at least one interfacial potential property value of said particulate material.

36. (Withdrawn): The quality control system of claim 35, further comprising a test for determining at least one morphological value of said particulate material.

37. (Withdrawn): A manufacturing facility for particulate material comprising the quality control system of claim 36.

38. (Withdrawn): A carbon black manufacturing facility comprising the quality control system of claim 36, wherein said particulate material is carbon black.

39. (Withdrawn): A quality control system for a product containing a particulate material comprising the quality control system of claim 36.

40. (Withdrawn): The quality control system of claim 39, wherein said final product is, an ink, coating, toner, polymer, elastomer, or combinations thereof.

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41. (Withdrawn): The method of claim 31, wherein said analyzing is done at regular time intervals during the manufacturing of said particulate material.
42. (Withdrawn): The method of claim 31, wherein said analyzing is done on a regular basis based on amounts of particulate material produced.
43. (Withdrawn): The method of claim 31, wherein said analyzing occurs at the site where said particulate material is being manufactured.
44. (New): A method of providing product consistency in the production of carbonaceous particulate material, comprising the steps of:
- a) producing carbonaceous particulate material as part of a process;
 - a) determining at least one morphological value of the carbonaceous particulate material and at least one interfacial potential property value of the carbonaceous particulate material;
 - b) comparing the determined morphological value of the carbonaceous particulate material to a target morphological value, and comparing the determined interfacial property value of the carbonaceous particulate material to a target interfacial potential property value; and
 - c) adjusting at least one process variable for the process correlated to:
 - morphological value if the determined morphological value is outside a prescribed numerical range of the target morphological value,
 - interfacial property value if the determined interfacial property value is outside a prescribed numerical range of the target interfacial property value,

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wherein the adjusting reduces a difference between the determined morphological value and the target morphological value or the determined interfacial property value and the target interfacial property value, as applicable.

45. (New): The method of claim 44, wherein the process variable is correlated to the interfacial potential property value.

46. (New): The method of claim 45, comprising implementing the adjusting of the process variable for the process correlated to interfacial property value if the determined interfacial property value is outside about 10% of the target interfacial property value.

47. (New): The method of claim 45, comprising implementing the adjusting of the process variable for the process correlated to interfacial property value if the determined interfacial property value is outside about 5% of the target interfacial property value.

48. (New): The method of claim 45, comprising selecting the interfacial potential property value from the group consisting of interfacial potential by masstone, interfacial potential by gas adsorption techniques, interfacial potential from adsorption from solution, interfacial potential from light scattering, interfacial potential from disc centrifuge, interfacial potential by oil absorption, interfacial potential by wicking rate, interfacial potential by rheological test, interfacial potential by sedimentation volumes, interfacial potential by phase segregation, interfacial potential by inverse has chromatography, and interfacial potential by spreading pressure.

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49. (New): The method of claim 45, further comprising determining a plurality of separate interfacial potential property values by interfacial potential by oil absorption for separate samples of carbonaceous particulate material, designating a highest value of the interfacial potential property values determined for the separate samples as being the target interfacial property value, and implementing the adjusting of the process variable for the process correlated to interfacial property value if any determined interfacial property value of the samples is outside about 10% of the target interfacial property value.

50. (New): The method of claim 49, comprising implementing the adjusting of the process variable for the process correlated to interfacial property value if any determined interfacial property value of the samples is outside about 5% of the target interfacial property value.

51. (New): The method of claim 45, wherein the interfacial potential property value is interfacial potential by wicking rate.

52. (New): The method of claim 44, wherein the process variable is correlated to the morphological value.

53. (New): The method of claim 52, comprising implementing the adjusting of the process variable for the process correlated to morphological value if the determined morphological value is outside about 10% of the target morphological value.